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TRAC BASED SENSING FOR AUTONOMOUS RENDEZVOUS

by

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ABSTRACT

This paper describes a TRAC (Targeting Reflective Alignment Concept) based sensing system for use in an autonomous rendezvous and docking experiment. The proposed experiment will utilize a COMET (COMmercial Experiment Transporter) based target satellite and a second chase vehicle. The sensor system consists of a target mounted on the target vehicle and a vision based sensor on the chase vehicle. The target has both active and passive components to enable the evaluation of both technologies. The chase vehicle will possess structured lighting and a single off the shelf camera.

Lighting will be provided by several strategically placed "kilo-bright" LEDs capable of emitting 2500 millicandela with 40 milliwatts of input. The structured lighting will be used to eliminate background illumination caused by earth shine and solar glare. The proposed CCD camera will utilize a fixed focal length, variable iris lens and a bandpass filter tuned to the LED color. Complex vision processing can be avoided using the structured lights, therefore data is expected to be obtained at a rate of several cycles per second.

Preliminary tests indicate the targeting system is capable of providing data from 1 meter to 300 meters range.

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